

# OR/14/047 Existing monitoring protocol and knowledge gaps

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Farr, G, and Hall J. 2014. Atmospheric deposition and groundwater dependent wetlands: implications for effective catchment management and future Water Framework Directive groundwater classification in England and Wales. *British Geological Survey Internal Report*, OR/14/047.

Protocols for the monitoring of Natura 2000 sites in response to the LPCD have recently been agreed between the regulatory and conservation bodies in England and Wales (Monteith et al. 2012a<sup>[1]</sup> and b<sup>[2]</sup>). Key points from the methodologies are summarised below and it is suggested that any further work as part of this project should be undertaken in line with existing and approved methodologies. In response to permitting under the LPCD (Large Plant Combustion Directive) (Monteith et al. 2012a<sup>[1]</sup>) ensured an agreed protocol for ecological and deposition monitoring at Natura 2000 sites has already been agreed by the regulatory bodies in England and Wales. Any proposed protocol should be reconsidered following more recent information and evidence.

The protocol covers the installation of deposition monitoring equipment including; bulk rain gauges for anion, cation, pH, specific conductivity and ammonium and phosphate testing. Field measurements and sample analysis for, gaseous concentrations including sulphur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>) and nitric acid (HNO<sub>3</sub>), soil solution chemistry and associated meteorological monitoring including precipitation and wind direction.

The protocol for ecological survey (Monteith et al. 2012b<sup>[2]</sup>) required site selection based on vegetation homogeneity of the area with preference given to sites where vegetation varied over the survey area of 1-2 hectares, ease of access and the likelihood of land management changes over the next four years. The site security was also assessed as the deposition monitoring equipment would need to be located in the vicinity. The vegetation survey plot 100 m x 100 m was divided into 2 x 2 m squares. A randomised plotting programme allowed the selection of 50 monitoring points within this area that were surveyed for both higher and lower plants. It is not known if concerns raised by Emmett et al. (2011)<sup>[3]</sup> about the suitability of the CSM (common standards monitoring) approach have been taken into account, if not this should be considered for any vegetation monitoring undertaken as a result of this project. Source apportionment studies would benefit from using the same or comparable methodologies to previous work to allow direct comparison between source apportionment studies.

[File:OR14047fig12.jpg](#)

**Figure 12** Vegetation monitoring in Cannock Chase (SSSI) using an agreed methodology to assess the effects of atmospheric nutrient deposition (from Monteith et al 2012b)<sup>[2]</sup>.

## References

- ↑ <sup>1.0</sup> <sup>1.1</sup> MONTEITH, D, SHERRIN, L, HENRYS, P, ROSE, R, HALFORD, A, SMART, S, and EVANS, C. 2012a. Monitoring of acidifying and eutrophifying deposition and ecological parameters at seven vulnerable Natura 2000 sites in England and Wales. First Report to the Power Station and Refinery Operators. *Center for Ecology and Hydrology*.
- ↑ <sup>2.0</sup> <sup>2.1</sup> <sup>2.2</sup> MONTEITH, D, SHERRIN, L, HENRYS, P, ROSE, R, HALFORD, A, SMART, S, and EVANS, C. 2012b. Monitoring of vegetation and bulk soil measurements at seven vulnerable Natura 2000 sites in England and Wales. Third Report to the Power Station and Refinery Operators. *Center for Ecology and Hydrology*.
- ↑ EMMET, B A, ROWE, E C, STEVENS, C J, GOWING, D J, HENRYS, P A, MASKELL, L C, and SMART, S M. 2011. Interpretation of evidence of nitrogen impacts on vitiation in relation to UK biodiversity objectives. *JNCC Report No. 449*.

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